BLUE RIVER FISHERIES SURVEY AND GAME FISH POPULATION ESTIMATES IN CRAWFORD, HARRISON, AND WASHINGTON COUNTIES

2000 Fish Management Report

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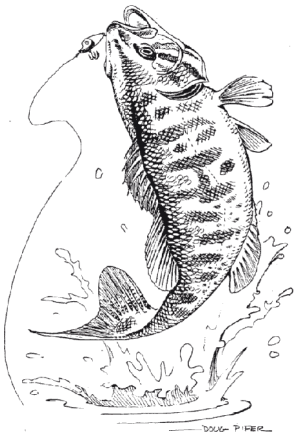

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INTRODUCTION

The Blue River watershed is located in south central Indiana and is composed of 125,000 acres in Clark, Crawford, Floyd, Harrison, and Washington counties. The Blue River is a tributary to the Ohio River and intersects it about three miles east of Leavenworth, Indiana (Figure 1). Most of the watershed in Washington, Floyd, and Clark counties is agricultural while Harrison and Crawford counties are heavily forested. The river is best described as a high quality, high gradient stream which receives a substantial portion of its discharge from subterranean sources. The lower five miles of river are more indicative of a southwest Indiana lowland river.

Harrison-Crawford State Forest, Wyandotte Caves, and Wyandotte Woods are located on the lower twenty miles of the Blue River. Forty-five miles of Blue River in Washington, Harrison, and Crawford counties were designated as a “State Scenic River” in 1975 to help prevent public and private projects which would destroy the river’s natural features.

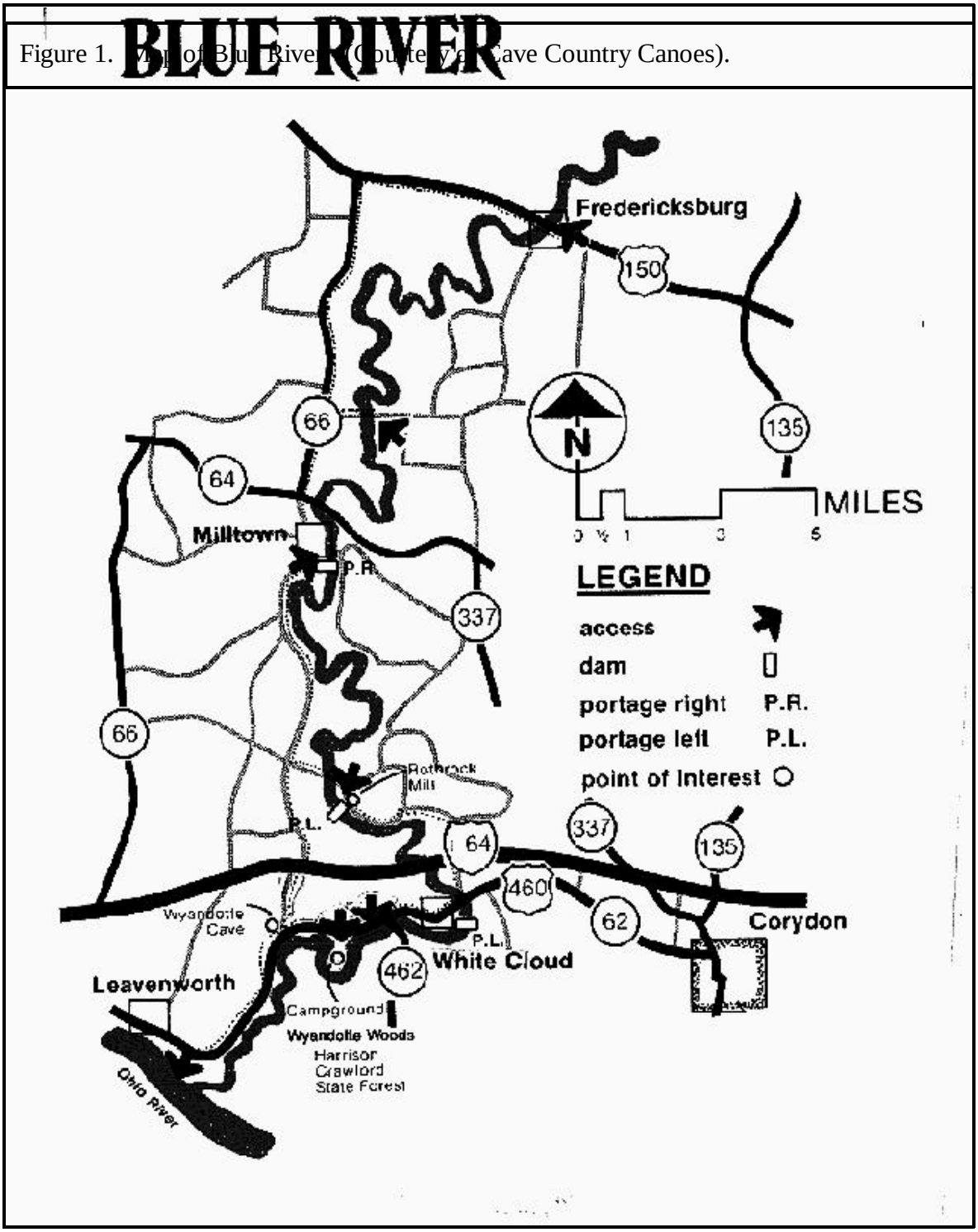
Eleven species within the watershed are listed by the Indiana Department of Natural Resources as endangered or of special concern. The special status species are; Endangered: Bluebreast darter (*Etheostoma camurum*), northern cavefish (*Amblyopsis spelaea*), spotted darter (*Etheostoma maculatum*), veriegate darter (*Etheostoma variatum*), hellbender (*Cryptobranchus alleganiensis alleganiensis*), clubshell (*Pleurobema clava*), pyramid pigtoe (*Pleurobema pyramidatum*), long-solid (*Fusconaia subrotunda*) and western cottonmouth (*Agkistrodon piscivorus leucostoma*); Special concern: Salamander mussel (*Simpsonaias ambigua*) and ohio pigtoe (*Pleurobema cordatum*).

Previous Blue River fisheries surveys were conducted in 1972 and 1993 (Janisch 1972, Stefanavage 1995). Previous game fish population estimates were conducted in 1998 and 1999, and a recreational use survey was also conducted in 1999 (Carnahan 1999 and 2001). In 1972, six stream reaches were sampled on the Blue River and nine reaches were sampled on Blue River tributaries. Seven reaches were sampled with an A.C. electrofishing boat, while rotenone was used on the other eight reaches. A total of 8,211 fish was sampled representing 48 species.

In 1993, nine river reaches were sampled in the spring and five of these were repeated in the fall. All sampling was conducted in the Blue River proper using a pulsed D.C. electrofishing boat to sample fish. A total of 10,090 fish was sampled from 14 families representing 60 species and one hybrid. Rock bass, smallmouth bass, and spotted bass accounted for 7%, 5%, and 2% of the

collection respectively.

Figure 1. Map of Blue River. (Courtesy of Cave Country Canoes).



Game fish population sizes were estimated in August 1998 and October 1999. The five fish collection sites remained the same throughout both surveys. In 1998, three of the sites were tote barge electrofished while two were boat electrofished. In 1999, four of the sites were tote barge electrofished and one boat electrofished.

The 2000 fisheries survey and game fish population estimates were conducted under work plan 98759 entitled, "Evaluation of Game Fish Populations and Recreational Uses on Indiana Streams." Work plan objectives are to provide 29,000 angler days with a satisfaction of at least 31% and to maintain the presence of native stream fishes.

METHODS

FISH MANAGEMENT SURVEY

Five river reaches were sampled during July 6 - 11, 2000. Three sampling reaches were located on the Crawford/Harrison County line at river miles (RM) 9.0 (at Stage Stop Campground), 14.7 (located along Harrison Springs Road), and 34.6 (approximately 2 miles upstream of the Milltown dam). The remaining two reaches were in Washington County at RM's 54.5 (along Green Mill Hill Road) and 62.4 (upstream of Fredericksburg where Mt. Carmel Road crosses the river). Sampling sites were labeled according to their approximate RM as determined by Hoggatt (1975). A river mile is defined as the number of miles of that particular river from its downstream confluence with a larger river.

Fish were sampled using a pulsed D.C. electrofishing boat at RM 34.6 and a pulsed D.C. tote barge at the other stations. Electrofishing effort consisted of 0.39 hour at RM 9.0, 0.33 hour at RM 14.7, 0.36 hour at RM 34.6, 0.57 hour at RM 54.5, and 0.46 hour at RM 62.4. Two dippers collected stunned fish at all stations. Electrofishing effort varied because the sites sampled were based on station length. The fisheries survey sampling stations were the same as the game fish population estimate sampling stations.

Fish were measured to the nearest 0.1 inch and weighed to the nearest 0.01 pound. Scale samples were taken on game fish for age determination. Species not readily identifiable in the field were preserved in 10% formalin and identified later.

GAME FISH POPULATION ESTIMATES

Four of the five stations sampled during the fish management survey were used for game fish population estimates. The sampling station at RM 14.7 was not used due to fallen trees blocking the access area. The four sampling sites used were the same sites used in determining game fish

population estimates in 1998 and 1999.

Sampling was conducted from October 24 - 26, 2000. Sampling reach lengths were determined from a hand held global positioning system unit. A pulsed D.C. tote barge electrofisher was used to sample fish at three of the stations (RM's 9.0, 54.5, and 62.4). A pulsed D.C. electrofishing boat was used at RM 34.6. All electrofishing was conducted during the day. Two dippers collected stunned fish at all stations. Game fish (smallmouth, spotted, rock, and largemouth bass, and all catfish species) were the target species during the survey.

All fish collected were measured to the nearest 0.1 inch and weighed to the nearest 0.01 pound. Scales samples were collected for age and growth analysis. Population estimates were obtained by using the depletion method and expanded with the Microfish 3.0 computer program (Van Deventer and Platts, 1986).

RESULTS

FISH MANAGEMENT SURVEY

A total of 926 fish was sampled that weighed 138.38 pounds (Table 1). Thirty-one species were sampled from six families (Table 2). The four most abundant species by number were longear sunfish, striped shiner, golden redhorse, and rock bass. Golden redhorse, northern hog sucker, rock bass, and smallmouth bass were most abundant by weight. The most fish (489) and species (20) were sampled at RM 62.4 (Appendix A). The least number of fish (51) and species (14) were sampled at RM 9.0.

Sunfish Family (Centrarchidae)

This was the most abundant family in the survey by number and second by weight (Table 2). Longear sunfish was the most abundant species followed by rock bass, smallmouth bass, and spotted bass. Longear sunfish are probably the most caught fish species in the river due to their abundance and tendency to hit many baits.

The 66 rock bass sampled accounted for 7% of the collection by number and 9% by weight. They ranged from 0.9 to 9.3 inches in length and were sampled at all five stations. The electrofishing catch rate was 31 per hour (Appendix A). The most rock bass were sampled at RM 62.4 and the least at RM's 9.0 and 34.6. Rock bass growth was slow compared to the Interior Plateau ecoregion average (Shipman 1997). Rock bass growth has remained relatively the same since 1998 (Appendix A).

Table 1. Name, number, percentage, size, weight and occurrence index of fishes collected from the Blue River, July 2000.

*COMMON NAME	NUMBER	PERCENT	LENGTH RANGE (inches)	WEIGHT (pounds)	PERCENT	OCCURRENCE INDEX
Longear sunfish	187	20.2	1.7 - 6.3	10.09	7.3	5
Striped shiner	157	17.0	2.3 - 6.5	1.18	0.9	2
Golden redhorse	114	12.3	2.2 - 16.8	75.72	54.7	5
Rock bass	66	7.1	0.9 - 9.3	11.90	8.6	5
Northern hog sucker	60	6.5	1.8 - 11.9	15.39	11.1	5
Banded sculpin	49	5.3	1.4 - 4.1	0.66	0.5	3
Bluntnose minnow	46	5.0	1.7 - 3.8	0.33	0.2	4
Greenside darter	44	4.8	1.2 - 4.0	0.26	0.2	4
Smallmouth bass	35	3.8	1.3 - 14.3	11.45	8.3	4
Cental stoneroller	24	2.6	1.5 - 4.7	0.16	0.1	3
Rosyface shiner	23	2.5	1.6 - 2.8	0.08	0.1	2
Banded darter	18	1.9	1.1 - 2.5	0.07	0.1	4
Logperch	18	1.9	3.6 - 5.7	0.62	0.4	4
Spotted darter	14	1.5	2.4 - 3.0	0.12	0.1	2
Rainbow darter	13	1.4	1.2 - 2.7	0.09	0.1	5
Sand shiner	12	1.3	1.5 - 2.5	0.05	<0.1	2
Fantail darter	9	1.0	1.5 - 2.7	0.03	<0.1	3
Shorthead redhorse	6	0.6	5.6 - 17.0	3.47	2.5	2
Spotted bass	6	0.6	4.5 - 8.4	0.66	0.5	2
Steelcolor shiner	6	0.6	2.8 - 4.3	0.05	<0.1	4
Streamline chub	3	0.3	3.7 - 5.0	0.09	0.1	2
Blackstripe topminnow	2	0.2	2.3 - 2.7	0.02	<0.1	1
Bluebreast darter	2	0.2	2.0	0.01	<0.1	1
Bluegill	2	0.2	4.6 - 5.0	0.15	0.1	1
Emerald shiner	2	0.2	3.0 - 4.5	0.02	<0.1	1
Freshwater drum	2	0.2	14.8 - 17.2	3.89	2.8	1
Largemouth bass	2	0.2	5.9 - 6.0	0.18	0.1	2
Black crappie	1	0.1	8.2	0.30	0.2	1
Green sunfish	1	0.1	5.1	0.10	0.1	1
Spotfin shiner	1	0.1	3.2	0.01	<0.1	1
Spotted sucker	1	0.1	14.4	1.23	0.9	1
Totals	926			138.38		

*Common name of fishes recognized by the American Fisheries Society.

A total of 35 smallmouth bass was sampled that weighed 11.45 pounds. They ranged in length from 1.3 to 14.3 inches. The smallmouth electrofishing catch rate was 17 per hour. RM 34.6 had the highest catch rate of 39 per hour. Smallmouth catches at RM's 14.7 and 62.4 were also good. RM 54.5 was the only station that a smallmouth was not sampled. Smallmouth growth slightly improved since last year (Appendix A).

Other family members of which few individuals were sampled were spotted bass (6), bluegill (2), largemouth bass (2), black crappie (1), and green sunfish (1). Collectively, these species accounted for 1% of the collection by number and weight.

Table 2. Species, number, and weight of fish families collected from Blue River, July 2000.

FAMILY		NUMBER	%	WEIGHT	%
Centrarchidae - Sunfishes		300	32.4	34.83	25.2
Black crappie	Longear sunfish				
Bluegill	Rock bass				
Green sunfish	Smallmouth bass				
Largemouth bass	Spotted bass				
Cyprinidae - Carp and Minnows		276	29.8	1.99	1.4
Blackstripe topminnow	Sand shiner				
Bluntnose minnow	Spotfin shiner				
Cental stoneroller	Steelcolor shiner				
Emerald shiner	Streamline chub				
Rosyface shiner	Striped shiner				
Catostomidae - Suckers		181	19.5	95.81	69.2
Golden redhorse	Shorthead redhorse				
Northern hog sucker	Spotted sucker				
Percidae - Perches		118	12.7	1.20	0.9
Banded darter	Logperch				
Bluebreast darter	Rainbow darter				
Fantail darter	Spotted darter				
Greenside darter					
Cottidae - Sculpins		49	5.3	0.66	0.5
Banded sculpin					
Sciaenidae - Drums		2	0.2	3.89	2.8
Freshwater drum					
TOTALS	31 species	926		138.38	

Carp and Minnow Family (Cyprinidae)

A total of 276 fish, representing 10 species of this family, was sampled that weighed 1.99 pounds. They were second in abundance by number (30%) and fourth by weight. In 1993, this family accounted for 25% of the collection. The three most predominant species sampled were striped shiner, bluntnose minnow, and central stoneroller.

Sucker Family (Catostomidae)

This group was the third most abundant by number (20%) and first by weight (69%). In 1993, this family accounted for 30% of the collection by number and 53% by weight. Golden redhorse was the most predominant species followed by northern hog sucker, shorthead redhorse, and spotted sucker. Golden redhorse and northern hog sucker are found throughout the entire river, while the other two species are most abundant from the Milltown dam to the Ohio River.

Perch Family (Percidae)

Seven species of this family were sampled. They accounted for 13% of the collection by number and 1% by weight. Greenside darter was the predominant species followed by banded darter, log perch, spotted darter, rainbow darter, fantail darter, and bluebreast darter. The spotted and bluebreast darters are state endangered species that are commonly found in the Blue River. Most of the darter species were found at nearly all the sampling stations.

Sculpin Family (Cottidae)

Banded sculpin was the only species of this family found in the Blue River. Banded sculpin accounted for 5% of the collection by number and less than 1% by weight. They were found at three of the five sampling stations. This species is very common throughout the entire river.

Drum Family (Sciaenidae)

Freshwater drum is the only member of this family found in Indiana. Only two were sampled during the survey which measured 14.8 and 17.2 inches in length. This species is most common from the Milltown dam downstream to the Ohio River.

Comparison to Previous Collections

Fish collection effort between the three surveys was not the same which makes it difficult to compare the collections. However, some comparisons to species sampled can be made. In 1972, 47 species were sampled from the Blue River and four of its tributaries. Four of the species (banded killifish, mud darter, popeye shiner, and white shiner) are in question since they have never been collected in this part of the state and have never been identified since from the Blue River. Most of the other species sampled in 1972 have since been found in the river, except for the southern redbelly dace and pugnose minnow (Appendix B).

Sixty species and one hybrid were sampled in 1993, which was a great improvement since 1972. Improved water quality over the 19 year period was most likely the major reason for the greater species diversity. Species that are common in the river now, such as, banded darter, emerald shiner, rainbow darter, spotfin shiner, spotted darter, and streamline chub were not found in 1973. Most of the species that were not sampled in 2000, but found in 1993, are most likely still present and were not sampled in 2000 due to the decreased sampling effort.

GAME FISH POPULATION ESTIMATES

Rock bass

A total of 61 rock bass was sampled that weighed 31.99 pounds (Appendix C). They ranged in length from 1.8 to 9.3 inches. Rock bass growth for all ages was nearly identical to previous years results (Table 3). However, rock bass growth was approximately an inch slower at ages 2 through 5 when compared to other fisheries in the Interior Plateau ecoregion, but improved to the ecoregion average for age 6 rock bass.

Table 3. Rock bass back calculated lengths (inches) at each age, Blue River, 1993, and 1998 - 2000.

	ROCK BASS BACK CALCULATED LENGTH (inches) AT EACH AGE							
Year	1	2	3	4	5	6	7	8
1993	1.9	3.0	4.4	5.8	6.9	7.8	8.6	9.0
1998	1.8	2.8	3.9	5.1	6.5	7.4	8.1	8.8
1999	1.8	2.8	3.9	5.0	6.2	7.3	8.2	
2000	1.8	2.8	3.8	4.9	6.3	7.5		
Interior plateau avg.*	2.0	3.6	4.9	6.6	7.2	7.8		

* Shipman, 1997

Rock bass population estimates ranged from 31 per mile (RM 9.0) to 179 per mile at RM 34.6 and averaged 113 per mile (Figure 2). Population estimates in 1998 and 1999 averaged 439 and 298 rock bass per mile respectively. The large decrease in population size was most likely due to the large amount of leaves floating on the river that made it difficult to see the fish once they were shocked. Rock bass population estimate in 2000 for Indian Creek (south central Indiana) averaged 368 per mile (Sapp, in Press).

Smallmouth bass

A total of 56 smallmouth bass was sampled that weighed 15.24 pounds. They ranged in length from 2.1 to 15.5 inches. Smallmouth growth for all ages slightly improved since last year. Growth rates for ages 1, 2, and 3 smallmouth were near the Interior Plateau ecoregion average, while age 4 fish were a half inch slower than the ecoregion average (Table 4).

Smallmouth bass population estimates ranged from 21 per mile (RM 54.5) to 219 per mile (RM 62.4) and averaged 114 per mile (Figure 3). This was a slight decrease from the 135 per mile average last year. The population increased at RM 62.4 and was approximately the same at RM's 9.0 and 34.6. The population at RM 54.5 decreased. The overall catch was good considering the poor visibility with all the leaves floating on the river. Smallmouth bass population estimate in Indian Creek averaged 303 per mile (Sapp, in Press).

Figure 2. Rock bass population estimates (number/mile), Blue River, 1998 - 2000.

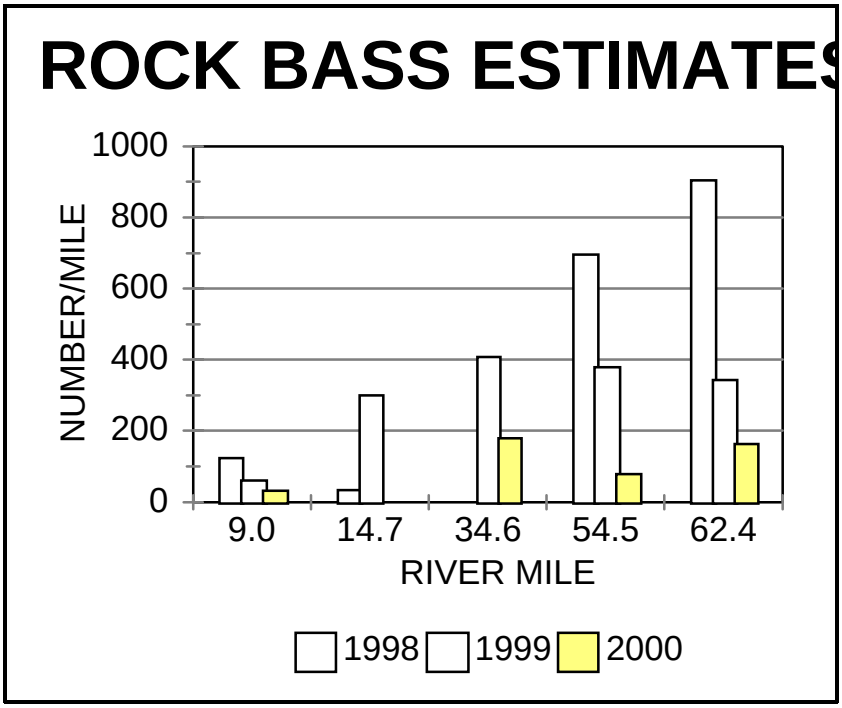


Table 4. Smallmouth bass back calculated lengths (inches) at each age, Blue River, 1993, and 1998 - 2000.

	SMALLMOUTH BASS BACK CALCULATED LENGTH (inches) AT EACH AGE					
Year	1	2	3	4	5	6
1993	3.2	6.1	8.7	10.6	13.0	15.0
1998	3.3	5.5	7.9	10.3	12.8	
1999	3.3	5.7	7.9	9.9	12.1	13.3
2000	4.1	6.3	8.6	10.6		
Interior plateau avg.*	3.8	6.4	8.8	11.2	12.2	15.0

* Shipman, 1997

Spotted bass

A total of 13 spotted bass was sampled that weighed 3.97 pounds. They ranged in length from 2.6 to 12.2 inches. Spotted bass growth was the same for age 1 fish and increased by a half inch for age 2 fish (Table 5). No older spotted bass were sampled.

Figure 3. Smallmouth bass population estimates (number/mile), Blue River, 1998 - 2000.

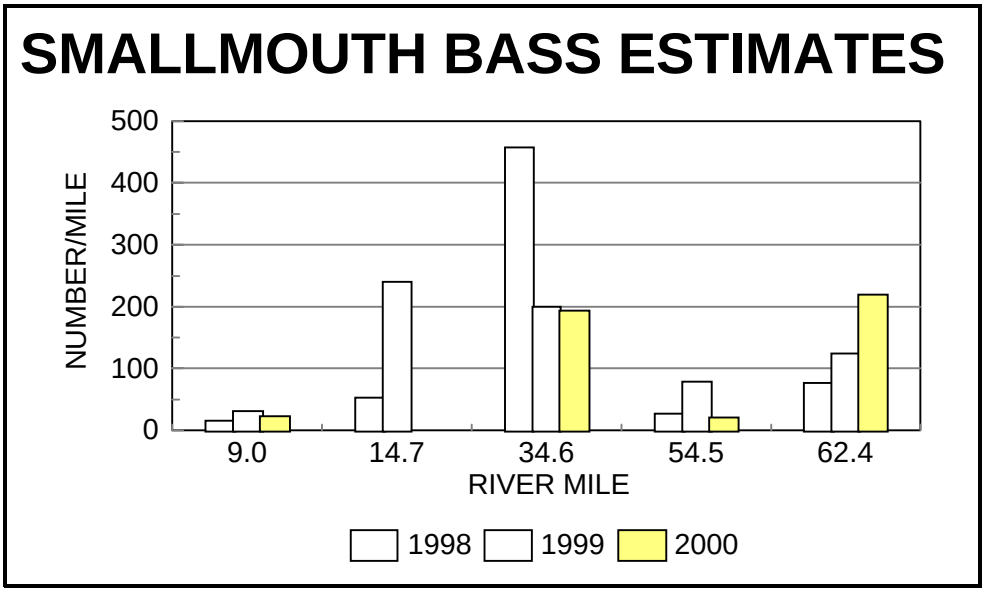
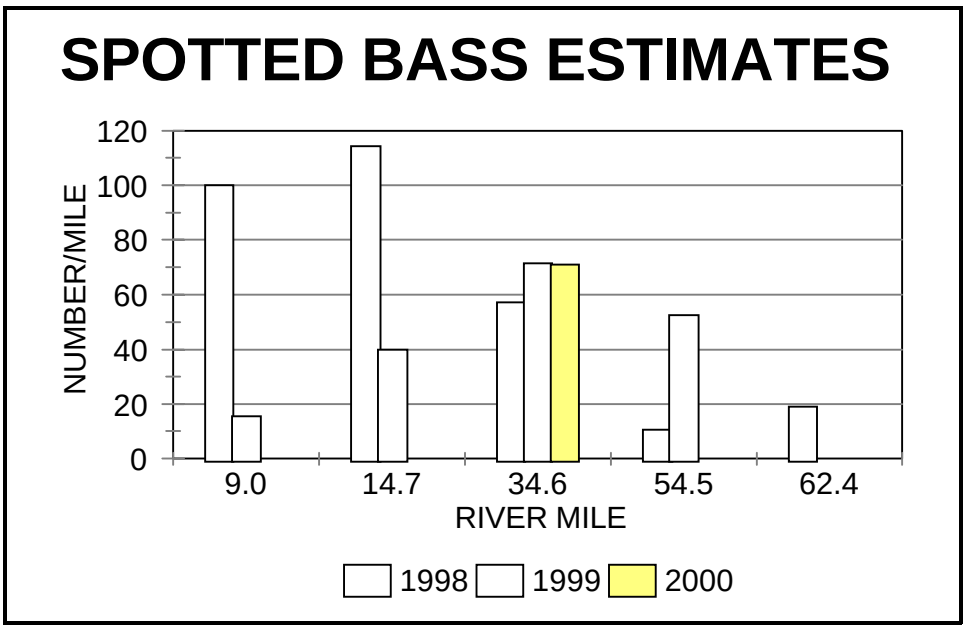


Table 5. Spotted bass back calculated lengths (inches) at each age, Blue River, 1993, 1998 - 2000.

	SPOTTED BASS BACK CALCULATED LENGTH (inches) AT EACH AGE				
Year	1	2	3	4	5
1993	2.3	5.0	7.7	9.5	11.3
1998	3.1	5.7	7.5	9.3	
1999	2.4	4.9	7.3		
2000	2.4	5.5			
Interior plateau avg.*	3.3	6.1	8.3	10.0	11.9

* Shipman, 1997

Figure 4. Spotted bass population estimates (number/mile), Blue River, 1998 - 2000.



Spotted bass were only sampled at RM 34.6. The population estimate at that RM was 71 per mile (Figure 4). The average population estimate for the river was 18 per mile. The spotted bass population estimates were nearly identical at RM 34.6 and decreased at RM's 9.0 and 54.5 compared to 1999 figures. No spotted bass have been sampled at RM 62.4 the last two years.

Other Game Fish

The only other game fish species sampled was largemouth bass. Population estimates were not calculated for largemouth due to the few number of individuals sampled.

CONCLUSION

Best fishing on the Blue River would be for rock bass, smallmouth bass, spotted bass, and longear sunfish. The high number of game fish in the river makes it an excellent spot to go fishing and catch a variety of fish species. The Blue possesses one of the best rock bass fisheries in the state with large numbers of big rock bass. It is also a great smallmouth fishery for catching a lot of bass, but not very large ones. The majority of the smallmouth observed during the survey were between 8 and 12 inches. There are also good opportunities to catch spotted bass. Longear sunfish were found in large numbers throughout the entire river and can easily be caught by any angler.

Unfortunately, longear rarely exceed 6 inches in length.

Population estimates decreased for both rock bass and smallmouth bass from 1999. The reason for this decrease was most likely due to poor sampling visibility with all of the leaves floating on the river. It is recommended that the 2004 population estimates be conducted in late September or early October before the leaves start accumulating on the river.

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Date: January 24, 2001

Approved by: _____
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Date: May 11, 2001

Appendix A
Fish Management Survey Data, Blue River, July 2000

APPENDIX B

Common and Scientific Names of Fishes Collected From the Blue River in 1972, 1993, and 2000.

APPENDIX C
Game Fish Population Estimate Survey Data, Blue River, October 2000